appearing boat losses on the other hand, is demanded. On those, grounds, charges for pneumatic refinement require quite definite composition \vhich permits only of variations within very narrow limits.

There are many qualities of pig iron which do not fulfil the conditions required in raw material for the pneumatic refining processes, and Further, there are large amounts of so-called 44 old materials"- that, is to say, scrap, of the most varied origin- the re-employment; of which is desirable and the composition of which is not suitable for treatment in the converter. A process which will admit of the employment of such materials can only be, conducted in an apparatus capable of supplying the necessary boat energy, without being dependent on the aid of the, materials composing the charge. < It requires a furnace, which admits of the attainment of the highest temperatures, and thus the industry was dependent on the discovery of the regenerative gas-firing system.

As the name implies, the fuel must be supplied to such furnaces in the form of gas ; thereby only is one able to completely control the. fir ing---that is to say, at all moments able to regulate the supply of hot gas and. air for combustion, and thereby genemte. exactly as much heat as is necessary for the purpose required.

In Nature combustible gases only occur in a few places-Natural combustible, materials are found generally in the solid sfnto, and must be, artificially converted into the form of gns. Thin is performed in gas producers or generators, from which the gas is conducted through gas Hues to the proper furnaces.

The. temperatures whle.h can be attained by the combustion iif Huch g»iH«*H with cold air are much under the height which is required for steel production. By means of preheating the air for combustion, in some cases also the gas, the temperature is able to lit* rapidly raised, and, therefore, as pointed out by IK II. Campbell in his treatise on "The Manufacture of Iron and Steel/1 "The problem in an open-hearth melting Furnace in not to rrttck the desired temperature, but to control th« temperature and prevent the roof and walls from melting down/*